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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/588,678
Filing Date: August 08, 2006
Appellant(s): RETTIG ET AL.

Michael J. Striker
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed February 25, 2009 appealing from the Office action mailed October 27, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,712,064	Eckardt et al.	12-1987
6,050,242	Wilkinson	04-2000
5,304,926	Wu	04-1994
4,859,941	Higgs et al.	08-1989

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 8 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Eckardt et al. (US4712064), hereinafter Eckardt.

Regarding claim 1, Eckardt discloses a magnetic sensor arrangement, having magnetically sensitive sensor elements whose electrical properties are changeable as a function of a magnetic field that a moving, passive transmitter element

is able to influence, with the magnetic field being substantially perpendicular to the sensor elements (See Eckardt FIGS. 8-9, note pair of sensors 18),

wherein the magnetic sensor arrangement has two sensor elements in a gradiometer arrangement (See col. 5, lines 8-32) that are each respectively associated with one of two regions of a permanent magnet embodied in the form of a gap magnet (See FIGS. 8-9, note face regions of magnet 13), which regions are spaced apart from each other by a predetermined distance (See FIGS. 8-9, note regions separate by gap 17),

the sensor elements are arranged one after the other in a direction of movement of the transmitter element (See FIGS. 8 and 9, note sensors 10);

the sensor elements are associated with edges of a gap in a rotary direction of the transmitter element (See FIGS. 8 and 9, note sensors 19 "associated" with edges of gap 17 through magnet);

the magnetic regions and the permanent gap magnet in terms of the dimensions, the gap width, the gap depth, and their positions in relation to the sensor elements are situated so as to minimize the offset of the output signal of the sensor elements in the gradiometer arrangement (See col. 5, lines 8-32).

Regarding claim 3, Eckardt discloses the gap of the permanent gap magnet has a rectangular contour (See FIGS. 8-9, note gap 17).

Regarding claim 8, Eckardt discloses the magnetic sensor arrangement is used to detect the rotation angle of a wheel serving as the transmitter element, and the

circumference of the wheel is provided with teeth in order to influence the magnetic field in the region of the magnetic sensor arrangement (See FIGS. 8-9, note wheel 28).

Regarding claim 10, Eckardt discloses the sensor elements are magnetoresistive XMR sensors (See FIGS. 8-9, note sensors 18 and disclosure related thereto).

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilkinson (US6050242).

Regarding claim 1, Wilkinson discloses a magnetic sensor arrangement, having

magnetically sensitive sensor elements whose electrical properties are changeable as a function of a magnetic field that a moving, passive transmitter element is able to influence, with the magnetic field being substantially perpendicular to the sensor elements (See Wilkinson FIGS. 1-7, note sensors H1 and H2 and magnet M3),

wherein the magnetic sensor arrangement has two sensor elements in a gradiometer arrangement (See FIG. 7, note sensor circuit) that are each respectively associated with one of two regions of a permanent magnet embodied in the form of a gap magnet (See FIGS. 1-7, particularly FIG. 6, note face regions of magnet M3), which regions are spaced apart from each other by a predetermined distance (See FIG. 6, note regions separate by gap in curvature in magnet M3),

the sensor elements are arranged one after the other in a direction of movement of the transmitter element (See FIG. 6, note sensors H1 and H2);

the sensor elements are associated with edges of a gap in a rotary direction of the transmitter element (See FIG. 6, note sensor are "associated" with edges of gap in magnet M3);

the magnetic regions and the permanent gap magnet in terms of the dimensions, the gap width, the gap depth, and their positions in relation to the sensor elements are situated so as to minimize the offset of the output signal of the sensor elements in the gradiometer arrangement (See FIGS. 6 and 7, note arrangement and circuit shown).

Regarding claim 2, Wilkinson discloses the gap has a contour with a wedge-shaped narrowing in the direction of the gap depth of the permanent gap magnet (See FIG. 6, note gap magnet M3).

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Wu (US5304926). Regarding this claim, Wu discloses a magnetic sensor arrangement, having

magnetically sensitive sensor elements whose electrical properties are changeable as a function of a magnetic field that a moving, passive transmitter element is able to influence, with the magnetic field being substantially perpendicular to the sensor elements (See Wu FIGS. 1-8, note sensors 12 and 14 and magnet 20),

wherein the magnetic sensor arrangement has two sensor elements in a gradiometer arrangement (See FIGS. 1-8, note sensors receiving opposite fields and in addition arrangement) that are each respectively associated with one of two regions of a permanent magnet embodied in the form of a gap magnet (See FIGS. 1-8, note sensors

12 and 14 at end regions of magnet), which regions are spaced apart from each other by a predetermined distance (See FIGS. 1-8, note gap in magnet),

the sensor elements are arranged one after the other in a direction of movement of the transmitter element (See FIGS. 1-3, note sensors staggered along direction of movement);

the sensor elements are associated with edges of a gap in a rotary direction of the transmitter element (See FIGS. 1-8, note sensors "associated" with gap edges of magnet);

the magnetic regions and the permanent gap magnet in terms of the dimensions, the gap width, the gap depth, and their positions in relation to the sensor elements are situated so as to minimize the offset of the output signal of the sensor elements in the gradiometer arrangement (See FIG. 1-8, note arrangement and circuit shown).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5 and 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Wu in view of Higgs et al. (US4859941), hereinafter Higgs. Regarding these claims, Wu teaches the sensors mounted adjacent the ends of the magnet, but not any flux conducting plates. Higgs teaches sensors mounted adjacent the end surface of bias

magnet wherein a flux conducting plate is provided between the magnet end and the sensor (See Higgs FIG. 1, note plate 16 between magnet 12 and sensors 19). It would have been obvious at the time the invention was made to incorporate the flux conducting plates between the magnet and sensors at taught by Higgs in the apparatus of Wu, such that there is are flux plates positioned between the sensor elements and affixed onto the magnet ends, which provides that each flux plate is embodied in the form of a compact element into which the gap is integrated. One having ordinary skill in the art would do so to make a more uniform magnetic field near the pole end of the magnet (See Higgs col. 1, lines 53-59).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eckardt in view of Higgs. Regarding this claim, Eckardt teaches the wheel is made from a non-magnetic material, but not explicitly the precise material. Higgs teaches a method for measuring the passing of a magnetic wheel using a pair of sensor mounted to a magnet, wherein the magnetic wheel is made from steel (See Higgs FIG. 1, item 20 and disclosure related thereto). It would have been obvious at the time the invention was made to use steel for the wheel in the apparatus of Eckardt. One having ordinary skill in the art would do because steel is a common magnetic material for such tooth gear wheels as noted in Higgs in the cited portion.

(10) Response to Argument

Response to Argument Related to First Ground of Rejection

In the arguments regarding the First Ground of Rejection, Appellants first argue that the arrangement in Eckardt is "different from the arrangement which is now defined in Claim 1." However, Eckardt reads on the arrangement of claim 1 as outlined above in the rejection and thus is the same as the arrangement claimed in claim 1.

Secondly, Appellants state that "The Examiner indicated that in the patent to Eckardt the slot shown the Figure 9 must be turned by 90 degrees to be similar to the present invention" and that such turning is not sufficient and the gradiometer principle will not be achieved. Initially, it is noted again here as in the Final Rejection that no such statement was ever made by Examiner, nor any similar statement.

Furthermore, no such turning is necessary for Eckardt to read on claim 1. Notably, claim 1 requires the sensors to be arranged one after the other in a direction of movement of the transmitter element, the sensors associated with edges of a gap in a rotary direction of the transmitter element, and further that the sensors are arranged in a gradiometer arrangement. Firstly, Eckardt explicitly discloses the sensors spaced apart in the direction of movement of the transmitter element (See Eckardt FIGS. 8-9, note sensors 18 spaced along magnet gap 17 in the direction of movement Z of transmitter element 29). Secondly, the claim does not define how is this association is carried out and thus the sensors of Eckart are "associated" with "edges of a gap in a rotary direction of the transmitter element (See Eckart FIGS. 8-9, note sensors 18 are "associated" with gap 17 and further note edges of gap 17 are in rotary direction Z

shown). Thirdly, a gradiometer is defined as an instrument for measuring the change of a physical quantity and thus the sensors measuring the change in rotation of the transmitter element 29 in the apparatus meets the gradiometer principle (See Eckardt FIGS. 8-10, note sensor 18 and circuit arrangement shown therein measuring change in rotation of transmitter element 29). Further Eckardt at col. 5, line 33 to col. 6, line 2 discloses subtracting the measurement signals from each sensor, i.e., determining the gradient of the magnetic field, to measure rotational position signal.

Finally, Appellants own gradiometer arrangement as shown in FIG. 1 of Appellants' application illustrates that sensors 7 and 8 can be placed in such a gradiometer arrangement by simply spacing them a gradiometer distance GM in the direction of the movement of the transmitter element (See Appellants application FIG. 1, note sensors 7 and 8 and see specification at page 7, line 27 to page 8, line 7). Thus, the sensors in Eckardt being spaced apart in the direction of movement of the transmitter element would be in a gradiometer arrangement even in the same manner as illustrated by Appellants.

For the forgoing reasons, the rejections of claim 1 as being anticipated by Eckardt et al. should be maintained. Since Appellants relied on the same argument for dependent claims 3, 8 and 10, the rejections therefor should be maintained for the same reasons.

Response to Argument Related to Second Ground of Rejection

In the arguments regarding the Second Ground of Rejection, Appellants first argue that the arrangement in Wilkinson does not operate according to the gradiometer principle. However, as noted above, a gradiometer is an instrument that measures the change of a physical quantity. As outlined in the apparatus Wilkinson, its system is to measure the change in rotation of a transmitter wheel and thus meets the definition of a gradiometer (See Wilkinson FIGS. 4, 6 and 7, note sensors measure change in rotation of transmitter element 3 and thus operate as gradiometer). Additionally, the voltages from the sensors in Wilkinson are subtracted to determine change, i.e., gradient, which reduces offsets.

Furthermore, Appellants own gradiometer arrangement as shown in FIG. 1 of Appellents' application illustrates that sensors 7 and 8 can be placed in such a gradiometer arrangement by simply spacing them a gradiometer distance GM in the direction of the movement of the transmitter element (See Appellants application FIG. 1, note sensors 7 and 8 and see specification at page 7, line 27 to page 8, line 7). Thus, the sensors in Wilkinson being spaced apart in the direction of movement of the transmitter element would be in a gradiometer arrangement even in the same manner as disclosed by Appellants.

Next, Appellants argue that the sensor arrangement of Appellants' invention is different from Wilkinson. However, Wilkinson reads on the arrangement of claim 1 as outlined above in the rejection and thus is the same as the arrangement claimed in claim 1.

Thirdly, Appellants argue that the magnet polarity of FIG. 6 in Wilkinson is not exactly explained. However, the polarity is explained in Wilkinson at col. 11, line 64 to col. 12, line 7 wherein it is noted that FIG. 6, is a modification of other embodiments to move the sensors closer to the transmitter wheel lobes (See e.g., Wilkinson FIG. 1) and simply uses a curved magnet for back biasing of the sensors. Thus, implicitly this magnet is of the same general construction having similar poles directed to the transmitter element, only the magnet is curved. Furthermore, one having ordinary skill would know that for the apparatus to work as intended in this portion of Wilkinson, the magnetic poles would be directed towards the transmitter element 3.

Finally, Appellants argue that there is no gap in the "magnets" (note claim 1 only requires one magnet). However, such statement ignores FIG. 6 of Wilkinson which illustrates the curved magnet. The curved shape provides a gap between front end corners of the magnet. The sensors H1 and H2 mounted on the front face of the magnet allows them to be positioned in the direction of rotation of the transmitter element 3 and "associated" with the edges/corners of the gap (See Wilkinson FIG. 6, note magnet 28 with sensors H1 and H2 mounted thereon).

For the forgoing reasons, the rejections of claim 1 as being anticipated by Wilkinson should be maintained. Since Appellants relied on the same argument for dependent claim 2, the rejection therefor should be maintained for the same reasons.

Response to Argument Related to Third Ground of Rejection

In the arguments regarding the Third Ground of Rejection, Appellants first argue that the arrangement in Wu does not operate according to the gradiometer principle. However, as noted above, a gradiometer is an instrument that measures the change of a physical quantity. As outlined in the apparatus Wu, its system is to measure the change in rotation of a transmitter wheel and thus meets the definition of a gradiometer (See Wu FIGS. 1-7, note sensors 12 and 14 measure change in rotation of transmitter element 24 and thus operated as gradiometer. See also col. 1, lines 7-12).

Furthermore, Appellants own gradiometer arrangement as shown in FIG. 1 of Appellants' application illustrates that sensors 7 and 8 can be placed in such a gradiometer arrangement by simply spacing them a gradiometer distance GM in the direction of the movement of the transmitter element (See Appellants application FIG. 1, note sensors 7 and 8 and see specification at page 7, line 27 to page 8, line 7). Thus, the sensors in Wu being spaced apart in the direction of movement of the transmitter element would be in a gradiometer arrangement even in the same manner as disclosed by Appellants.

Secondly, Appellants argue that the sensor arrangement of Appellants' invention is different from Wu. However, Wu reads on the arrangement of claim 1 as outlined above in the rejection and thus is the same as the arrangement claimed in claim 1.

Appellants third argument, as is best understood, is that because both sensors of Appellants' have the same magnetic field direction B, Wu with each sensor having a different magnetic field direction therethrough does not read on the claims. As

illustrated in Wu and noted by Appellant in the arguments, the magnet of the Wu apparatus is a u-shaped magnet with a North or South field emanating from each respective end and perpendicularly passing through respective sensors mounted on the ends thereof (See Wu FIG. 1, note N pole at one end and S pole at other end of magnet 20 and sensors 12 and 14 thereon). Wu thus discloses two portions of the magnetic field of the magnet, albeit different polarities thereof, substantially perpendicular to the sensor elements. However, it is noted that claim 1 only requires the magnetic field to be "substantially perpendicular to the sensor elements", it is silent as to which direction or any requirement the same North or South poles pass through each sensor. Accordingly, Wu discloses the magnetic field substantially perpendicular to the sensors as recited in the claims even though it is directed through each sensor in a different direction.

For the forgoing reasons, the rejections of claim 1 as being anticipated by Wu should be maintained.

Response to Argument Related to Fourth Ground of Rejection

In the arguments regarding the Fourth Ground of Rejection, Appellants do not provide any further arguments beyond those with respect to the rejection of claim 1 as being anticipated by Wu. Since Appellants relied on the same arguments for dependent claims 5 and 6, the rejections therefor should be maintained for the same reasons.

Response to Argument Related to Third Ground of Rejection

In the arguments regarding the Fourth Ground of Rejection, Appellants do not provide any further arguments beyond those with respect to the rejection of claim 1 as being anticipated by Eckardt. Since Appellants relied on the same arguments for dependent claim 9, the rejections therefor should be maintained for the same reasons.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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